



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/540,741

06/24/2005

Volodya Grancharov

915-008.037

2915

4955 7590 07/22/2008

WARE FRESSOLA VAN DER SLUYS & ADOLPHSON, LLP
BRADFORD GREEN, BUILDING 5
755 MAIN STREET, P O BOX 224
MONROE, CT 06468

EXAMINER

SHAH, PARAS D

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

07/22/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/540,741	Applicant(s) GRANCHAROV ET AL.	
	Examiner PARAS SHAH	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03/03/2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21, 26 and 32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21, 26 and 32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is in response to the Amendments and Arguments filed on 03/03/2008. Claims 1-21, and 26 remain pending, with claim 32 newly added, where all claims have been examined. The Applicants' amendment and remarks have been carefully considered, but they do not place the claims in condition for allowance. Accordingly, this action has been made FINAL.

2. All previous objections and rejections directed to the Applicant's disclosure and claims not discussed in this Office Action have been withdrawn by the Examiner.

Change of Examiner

3. It should be noted that the Examiner for this Application has changed from Benjamin Gaddy to Paras Shah.

Response to Corrected Filing Receipt

4. In response to the request for corrected filing receipt, the submitted documents as evidence has been considered and a decision is still pending and will be sent out in due course.

Response to Arguments

5. Applicant's arguments (pages 8-11) filed on 03/03/2008 with regard to claims 1-21, and 26 have been fully considered but they are moot in view of new grounds for rejection.

Response to Amendment

6. Applicants' amendments filed on 03/03/2008 have been fully considered. The newly amended limitations in claims 1, 14, 15, 26, and 32 necessitate new grounds of rejection.

Specification

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The limitation of "computer readable medium" is not defined in the specification as recited in claim 26.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-3, 8-10, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378).

Consider claims 1 and 26. Atal discloses a method of filtering a speech signal (see Col. 9, lines 32-40, where Atal discusses an adaptive feedback filter for speech), the method involving the steps of providing a filter suited for reduction of distortion caused by speech coding (see Col. 9, lines 20-25, where Atal discusses a filter and Col. 9, lines 35-45, where Atal discusses reducing quantizing noise and prediction

parameter signals); predicting acoustic noise in said speech signal (see Col. 9, lines 50-57, where Atal discusses the filter is weighted according to the formant prediction parameters); adapting said filter in response to the predicted acoustic noise to obtain an adapted filter (see Col. 9, lines 35-40, where Atal discusses the operation of the adaptive filter); and applying said adapted filter to said speech signal so as to reduce acoustic noise and distortion caused by speech coding in said speech signal (see Col. 9, lines 45-50, where Atal discusses the distortion due to noise is reduced).

Atal does not specifically disclose estimating background acoustic noise, however Tasaki discloses estimating background acoustic noise (see col. 6, lines 15-17, background noise likelihood calculator 16 and background noise power updater 16). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use estimating acoustic noise as taught by Tasaki, thus suppressing noise to prevent speech quality losses, as discussed by Tasaki (see col. 1, lines 12-14).

Consider claim 2: Atal discloses adapting a filter involves adjusting filter coefficients of said filter (see Col. 10, lines 38-51, where Atal discusses the filter parameter signals, therefore the coefficients, are modified).

Consider claim 3: Atal as modified by Tasaki discloses steps of estimating, adapting and applying are performed for portions of said speech signal which contain speech as well as for portions which do not contain speech (see Atal Col. 9, lines 45-50, where Atal discusses the distortion of speech due to noise is reduced; and Tasaki

Col. 9, lines 15-30, where Tasaki discusses the weighting of the signal based on background noise determination).

Consider claim 8: Atal discloses estimating, adapting and applying are performed after decoding said speech signal (see Col. 11, line 62- Col. 12, line 8).

Consider claim 9: Atal discloses estimating; adapting and applying are performed before encoding said speech signal (see Fig. 1, and Col. 11, lines 50-64).

Consider claim 10: Atal discloses a speech signal comprises speech frames and wherein said estimating, adapting and applying are performed on a frame-by-frame basis (see Col. 5, line 64 – Col. 6, line 9, where Atal discusses frames).

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) as applied to claims 1 above, and further in view of Crozier (US 5,742,927).

Consider claim 4: Atal as modified by Tasaki discloses a short-term filter function designed for reducing noise between spectrum formant peaks of said speech signal and wherein said filter coefficients include at least one coefficient that controls the frequency response of said short-term filter function (see Col. 9, lines 50-60, and Col. 10, lines 38-51, where Atal discusses the filter parameter signals).

Atal does not specifically disclose attenuation between spectrum formant peaks, however Crozier discloses attenuation between spectrum formant peaks (see Col. 4, lines 5-15, where Crozier discusses attenuation of regions between formants). It would have been obvious to one skilled in the art at the time the invention was made

to modify the invention of Atal, and use attenuation between spectrum formant peaks as taught by Crozier, thus avoiding noise-related problems such as impaired quality, as discussed by Crozier (see Col. 1, lines 14-20).

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) and Crozier (US 5,742,927) as applied to claim 4 above, and further in view of Sluijter (US 6,363,340).

Consider claim 5: Atal discloses a spectrum compensation function and wherein said filter coefficients include at least one coefficient that controls said spectrum compensation function (see Col 10, lines 10-20, and Eqn. 18).

Atal does not specifically disclose tilt compensation, however Sluijter discloses tilt compensation (see Col. 12, lines 42-53, where Sluijter discusses adaptive tilt compensation). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use tilt compensation as taught by Sluijter, thus improving speech quality in the presence of noise, as discussed by Sluijter (see Col. 1, lines 48-52).

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) as applied to claims 1 and 15 above, and further in view of Sluijter (US 6,363,340).

Consider claim 6: Atal discloses acoustic noise in said speech signal is estimated as relative noise energy (see Col. 9, lines 45-50, where Atal discusses speech signal to quantizing noise ratio) and noise spectrum (see Col 10, lines 10-20, and Eqn. 18).

Atal does not specifically disclose spectrum tilt, however Sluijter discloses spectrum tilt (see Col. 12, lines 42-53, where Sluijter discusses adaptive tilt compensation). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use spectrum tilt as taught by Sluijter, thus improving speech quality in the presence of noise, as discussed by Sluijter (see Col. 1, lines 48-52).

13. Claims 7, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) as applied to claims 2 and 16 above, and further in view of Kang (US 5,448,680).

Consider claim 7: Atal as modified by Tasaki discloses adapting is performed by selecting values for said filter coefficients from a table which maps a plurality of values of estimated background acoustic noise to a plurality of filter coefficient values (see Col. 10, lines 52-60, where Atal discusses a filter coefficient generator)

Atal and Tasaki do not specifically disclose a lookup table, however Kang discloses a lookup table (see Col. 5, line 67 – Col. 6, line 16, where Kang discusses a lookup table). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal and Tasaki, and use a lookup table as

taught by Kang, thus providing increased tolerance to errors, as discussed by Kang (see Col. 1, lines 24-38).

Consider claim 11: Atal as modified by Tasaki and Kang discloses the initial steps of initially generating said lookup table by: adding different artificial noise power spectra having given parameter (s) of background acoustic noise to different clean speech power spectra; optimizing a predetermined distortion measure by applying said filter to different combinations of clean speech power spectra and artificial noise power spectra; and for said different combinations, saving in said lookup table those filter coefficient values, for which said predetermined distortion measure is optimal, together with corresponding value (s) of said given parameter (s) of acoustic noise (see Kang, Col. 6, lines 10-60).

Consider claim 12: Atal discloses Spectral Distortion (see Col. 8, lines 30-64).

14. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) and Kang (US 5,448,680) as applied to claim 11 above, and further in view of Sluijter (US 6,363,340).

Consider claim 13: Atal discloses acoustic noise in said speech signal is estimated as relative noise energy (see Col. 9, lines 45-50, where Atal discusses speech signal to quantizing noise ratio) and noise spectrum (see Col 10, lines 10-20, and Eqn. 18).

Atal does not specifically disclose spectrum tilt, however Sluijter discloses spectrum tilt (see Col. 12, lines 42-53, where Sluijter discusses adaptive tilt compensation). It

would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use spectrum tilt as taught by Sluijter, thus improving speech quality in the presence of noise, as discussed by Sluijter (see Col. 1, lines 48-52).

15. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) as applied to claim 10 above, and further in view of Arslan *et al.* (US 5,706,395) and in view of Sluijter (US 6,363,340)

Consider claim 14: Atal discloses acoustic noise in said speech signal is estimated as relative noise energy (see Col. 9, lines 45-50, where Atal discusses speech signal to quantizing noise ratio) and noise spectrum (see Col 10, lines 10-20, and Eqn. 18).

However, Atal in view of Tasaki do not specifically teach the deciding whether the estimated relative noise energy for a current speech frame is below a predetermined threshold; and if so, not performing said steps of adapting filter coefficients and applying said filter, and instead performing energy attenuation on the current speech frame so as to suppress acoustic noise in a speech pause.

Arslan does teach the said estimating background acoustic noise, of deciding whether the estimated relative noise energy for a current speech frame is below a predetermined threshold; and if so, not performing said steps of adapting filter coefficients and applying said filter, and instead performing energy attenuation on the current speech frame so as to suppress acoustic noise in a speech pause (Arslan

Col. 9, lines 50-67). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use the energy attenuation as taught by Arslan, thus suppressing noise to prevent speech quality losses, as discussed by Arslan (see Col. 2, lines 30-38).

Atal in view of Tasaki in view of Arslan do not specifically disclose spectrum tilt, however Sluijter discloses spectrum tilt (see Col. 12, lines 42-53, where Sluijter discusses adaptive tilt compensation). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use spectrum tilt as taught by Sluijter, thus improving speech quality in the presence of noise, as discussed by Sluijter (see Col. 1, lines 48-52).

16. Claims 15-17, 21, 26, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) and further in view of Ojala (WO 99/38155).

Consider claims 15 and 32, Atal discloses a method of filtering a speech signal (see Col. 9, lines 32-40, where Atal discusses an adaptive feedback filter for speech), the method involving the steps of providing a filter suited for reduction of distortion caused by speech coding (see Col. 9, lines 20-25, where Atal discusses a filter and Col. 9, lines 35-45, where Atal discusses reducing quantizing noise and prediction parameter signals); predicting acoustic noise in said speech signal (see Col. 9, lines 50-57, where Atal discusses the filter is weighted according to the formant prediction

parameters); adapting said filter in response to the predicted acoustic noise to obtain an adapted filter (see Col. 9, lines 35-40, where Atal discusses the operation of the adaptive filter); and applying said adapted filter to said speech signal so as to reduce acoustic noise and distortion caused by speech coding in said speech signal (see Col. 9, lines 45-50, where Atal discusses the distortion due to noise is reduced).

Atal does not specifically disclose estimating background acoustic noise, however Tasaki discloses estimating background acoustic noise (see col. 6, lines 15-17, background noise likelihood calculator 16 and background noise power updater 16). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use estimating acoustic noise as taught by Tasaki, thus suppressing noise to prevent speech quality losses, as discussed by Tasaki (see col. 1, lines 12-14).

However, Atal in view of Tasaki do not specifically teach the use of a postfilter controller.

Ojala does teach using a post filter controller (see page 8, lines 20-35, post filter are adjusted based on the voicing characteristics). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal in view Tasaki, and use the post filtering controller as taught by Ojala, to improve speech signal quality as a result from decoding, as discussed by Ojala (see page 7, lines 35-37).

Consider claims 16: Atal discloses adapting a filter involves adjusting filter coefficients of said filter (see page 8, lines 22-26, weighting factors are adjusted based on the voicing decision that was determined.)

Consider claims 17: Atal as modified by Tasaki discloses steps of estimating, adapting and applying are performed for portions of said speech signal which contain speech as well as for portions which do not contain speech (see Atal Col. 9, lines 45-50, where Atal discusses the distortion of speech due to noise is reduced; and Tasaki Col. 9, lines 15-30, where Tasaki discusses the weighting of the signal based on background noise determination).

Furthermore, Ojala teaches the postfilter controller for adapting said filter to operate on portions of said speech signal and non-speech portions (see page 8, lines 26-30, postfiltering is applied to speech and nonspeech portions).

Consider claim and 21: Atal discloses a speech signal comprises speech frames and wherein said estimating, adapting and applying are performed on a frame-by-frame basis (see Col. 5, line 64 – Col. 6, line 9, where Atal discusses frames).

Furthermore, Ojala teaches the postfilter controller for operating on the speech signal on a frame-by-frame basis (see col. 10, lines 29-35, frame by frame analysis is performed).

17. Claims 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) in view of Ojala as applied to claims 1 and 15 above, and further in view of Crozier (US 5,742,927).

Consider claims 18: Atal as modified by Tasaki discloses a short-term filter function designed for reducing noise between spectrum formant peaks of said speech signal and wherein said filter coefficients include at least one coefficient that controls the frequency response of said short-term filter function (see Col. 9, lines 50-60, and Col. 10, lines 38-51, where Atal discusses the filter parameter signals).

Atal does not specifically disclose attenuation between spectrum formant peaks, however Crozier discloses attenuation between spectrum formant peaks (see Col. 4, lines 5-15, where Crozier discusses attenuation of regions between formants). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use attenuation between spectrum formant peaks as taught by Crozier, thus avoiding noise-related problems such as impaired quality, as discussed by Crozier (see Col. 1, lines 14-20).

18. Claim 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) in view of Ojala as applied to claim 15 above, and further in view of Sluijter (US 6,363,340).

Consider claim 19: Atal discloses acoustic noise in said speech signal is estimated as relative noise energy (see Col. 9, lines 45-50, where Atal discusses

speech signal to quantizing noise ratio) and noise spectrum (see Col 10, lines 10-20, and Eqn. 18).

Atal does not specifically disclose spectrum tilt, however Sluijter discloses spectrum tilt (see Col. 12, lines 42-53, where Sluijter discusses adaptive tilt compensation). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal, and use spectrum tilt as taught by Sluijter, thus improving speech quality in the presence of noise, as discussed by Sluijter (see Col. 1, lines 48-52).

19. Claim 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atal (US 4,133,976) in view of Tasaki (US 6,526,378) in view of Ojala as applied to claim 16 above, and further in view of Kang (US 5,448,680).

Consider claim 20: Atal as modified by Tasaki as modified by Ojala discloses adapting is performed by selecting values for said filter coefficients from a table which maps a plurality of values of estimated background acoustic noise to a plurality of filter coefficient values (see Col. 10, lines 52-60, where Atal discusses a filter coefficient generator) and using a postfilter controller (see Ojala, page 8, lines 20-37).

Atal and Tasaki do not specifically disclose a lookup table, however Kang discloses a lookup table (see Col. 5, line 67 – Col. 6, line 16, where Kang discusses a lookup table). It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Atal and Tasaki and Ojala, and use a lookup

table as taught by Kang, thus providing increased tolerance to errors, as discussed by Kang (see Col. 1, lines 24-38).

Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to PARAS SHAH whose telephone number is (571)270-1650. The examiner can normally be reached on MON.-THURS. 7:00a.m.-4:00p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571)272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paras Shah/

Application/Control Number: 10/540,741
Art Unit: 2626

Page 16

Examiner, Art Unit 2626

06/19/2008

/Patrick N. Edouard/

Supervisory Patent Examiner, Art Unit 2626